**Ayers, R. S. and D. W. Westcot. 1976. *Water Quality for Agriculture*. Food and Agriculture Organization of the United Nations: Rome.** (Reviewed by Elizabeth Parsons)

This report was written in the 1970s in Rome, but its information is not location- and era-specific. It deals with the question of water quality for agriculture, focusing on how to measure water quality, standards of quality, typical problems in agricultural water use, and the ramifications for livestock and the environment. Early in the report the authors point out that the standards of quality are different for different uses: ". . . most river waters are of good quality for irrigation but may be unacceptable for municipal use without treatment. After chlorination, low salinity water is of excellent quality for municipal use but may be too corrosive for industrial use without further treatment" (p. 2).

The four main areas of agricultural problems are salinity (the quantity and kind of salts in the water), permeability (how well the water is able to seep into the soil), toxicity (water content of specific chemicals), and miscellaneous. Extremely high salt content in irrigation water reduces crop production because the plants need to work harder to extract water that is heavy with salts from the soil. Permeability depends to a high degree on the type of soil, but extremely low salinity water breaks down important nutrients in the soil before they can reach the plant. In the toxicity section they mainly look at levels of sodium, chloride, and boron. The miscellaneous section mostly focuses on the presence of additional chemical compounds, namely nitrogen, bicarbonate, and pH.

Although the report doesn't refer explicitly to human health risks due to using contaminated irrigation water, it devotes a section to the risks to livestock. Livestock are presumed to drink the water directly (rather than consume the foods produced with the water) so the risks are greater and more direct. Too much salinity in the water can kill livestock. The presence of other chemicals can cause health problems depending on the size of the animal and the amount of water consumed.

The report also covers the use of sewage as irrigation water. The authors conclude that sewage that has been through primary and secondary treatment is acceptable and presents no health risks, but sewage that has been through only primary treatment may cause some problems due to pathogenic micro-organisms.

**Critique**

This report provides interesting information about water quality for agriculture, but it fails to mention whether there are any known risks to humans from eating foods irrigated with poor-quality water. My question is not whether it would cause health problems to drink the water (obviously in the case of livestock it does), but whether toxins from the water can cause the plants themselves to become toxic. The report also focused more on naturally-occurring pollutants than on industrial and municipal byproducts. Probably the most relevant piece of information was the section on the use of sewage as irrigation water.

Although this report comes close to touching on human health concerns, its omission only emphasizes the need for future research on the topic. The Food and Agriculture Organization of the United Nations is probably quite reliable, considering that it is not bound by allegiance to any specific country's water policies. I wouldn't recommend this report to someone seeking current, Willamette-specific information, but it could be helpful for someone who wants to look at general water quality concerns in agriculture and for livestock.

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